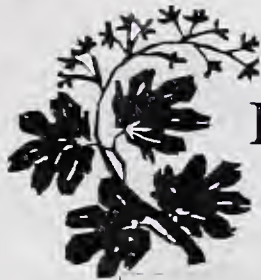


MASS. EA32.2:G 94/3



Natural Heritage & Endangered Species Program

Commonwealth of Massachusetts
Division of Fisheries & Wildlife
Field Headquarters
Route 135
Westborough, MA 01581
(508) 792-7270, ext. 200



VERNAL POOLS

GOVERNMENT DOCUMENTS
COLLECTION

OCT 27 1999

What Is a Vernal Pool?

Vernal pools are temporary bodies of freshwater that provide critical habitat for many vertebrate and invertebrate wildlife species. "Vernal" means spring, and indeed, most vernal pools are filled by spring rains and snowmelt, only to dry up during the hot, dry months of summer. Many vernal pools, though, are filled by the rains of autumn and may persist throughout the winter. Vernal pools are often very small and shallow; vernal pools which support rich communities of amphibians and invertebrates may measure only a few yards across. However, vernal pools of several acres are not rare throughout much of Massachusetts.

Where are Vernal Pools Found?

Vernal pools are common in Massachusetts, probably occurring in almost every town in the state. Vernal pools are found across the landscape, anywhere that small woodland depressions, swales or kettle holes collect spring runoff or intercept seasonally high groundwater tables. Although many people associate vernal pools only with wooded areas, ecologically significant vernal pools are also found in meadows, sand flats, river floodplains, and in large vegetated wetland complexes.

Why are Vernal Pools Valuable?

Vernal pools constitute a unique and increasingly vulnerable type of wetland that is inhabited by many species of wildlife, some of which are totally dependent on vernal pools for their survival. Since vernal pools are temporary bodies of water, they do not support fish populations. The Wood Frog (*Rana sylvatica*), the Eastern Spadefoot Toad (*Scaphiopus holbrookii*) and the four local species of mole salamander (*Ambystoma spp.*) have evolved breeding strategies intolerant of fish predation on their eggs and larvae; the lack of fish populations is essential to the breeding success of these species. Other amphibian species, including the American Toad (*Bufo americanus*), Green Frog (*Rana clamitans*) and the Red-spotted Newt (*Notophthalmus viridescens*), often exploit the fish-free waters of vernal pools but do not depend upon them. Vernal pools also support a rich and diverse invertebrate fauna. Some invertebrates species, such as fairy shrimp (*Eubrachyus spp.*) complete their entire live cycle in vernal pools. Invertebrates are both important predators and prey in vernal pool ecosystems. Vernal pools are an important habitat resource for many species of birds, mammals, reptiles and amphibians.

Are Vernal Pools a Threatened Resource?

Yes! Prior to 1987, vernal pools in Massachusetts were not given protection under the state's Wetlands Protection Act, and protection under the federal Clean Water Act was not always administered consistently or adequately. As a result, many vernal pools were filled as part of the rapid development that has occurred throughout the Commonwealth in the past several decades. Three species of mole salamanders, the Eastern Spadefoot Toad, and two crustaceans, all of which require vernal pools, are now considered rare in Massachusetts.

Vernal Pool Protection

The Massachusetts Wetlands Protection Act, Title V of the Massachusetts Environmental Code, the Massachusetts Surface Water Quality Standards, and the Forest Cutting Practices Act all provide certain regulatory protection for vernal pool habitat. Such protection is not automatic, however. The Wetlands Protection Act regulations protect vernal pools located only within Wetland Resource Areas. The regulations presume that vernal pools do not exist on a site unless they have been officially certified by the Natural Heritage & Endangered Species Program of the Division of Fisheries & Wildlife, or if scientific evidence is presented to the local conservation commission or DEP which clearly demonstrates that a Wetlands Resource Area functions as wildlife habitat. The regulations for Title V, the Massachusetts Surface Water Quality Standards, and the Forest Cutting Practices Act protect vernal pools, regardless of their size or location, if certified by the Division. Only vernal pools that meet certain biological and physical criteria established by the Natural Heritage & Endangered Species Program can be certified.

How Can Vernal Pools be Certified?

The Certification Program depends entirely on the initiative of interested individuals and organizations. Interested parties should:

1. Contact the Massachusetts Natural Heritage & Endangered Species Program to obtain the "Guidelines for the Certification of Vernal Pool Habitat," along with several Vernal Pool Field Observation Forms;
2. Locate potential vernal pools and complete the Field Observation Form;
3. Submit the Field Observation Forms, along with supporting physical and biological evidence and required mapping documentation to the NH&ESP for review (the preferred type of evidence needed for meeting the biological certification criteria is photographic documentation of breeding by Wood Frogs or mole salamanders, or the presence of fairy shrimp. See the "Guidelines" for details).

Following receipt of certification materials, the Natural Heritage & Endangered Species Program will consider the completeness and accuracy of the information and documentation presented. The observer, town conservation commission and the regional office of the Department of Environmental Protection will be notified of the certification of the vernal pool when complete. The locations of Certified Vernal Pools are plotted on maps supplied to town conservation commissions containing the "Estimated Habitats of Rare Wetlands Wildlife and Certified Vernal Pools" on a biennial basis. The Natural Heritage & Endangered Species Program also produces a state-wide Atlas of these maps available at cost.

To determine whether or not a vernal pool falls within a Wetlands Resource Area, contact the members of your local conservation commission. For general information regarding the Wetlands Protection Act, as well as the names and addresses of local conservation commissioners, call the Massachusetts Association of Conservation Commissions at (617) 489-3930. For specific information regarding the regulatory protection afforded certified vernal pools, as well as uncertified vernal pools, contact the Department of Environmental Protection.

January 1996



RICHARD CRONIN
DIRECTOR

The Commonwealth of Massachusetts
Division of Fisheries and Wildlife
Leverett Saltonstall Building, Government Center
100 Cambridge Street, Boston 02202

May, 1988

GOVERNMENT DOCUMENTS
COLLECTION

OCT 27 1999

GUIDELINES FOR CERTIFICATION OF VERNAL POOL HABITAT

INTRODUCTION

Importance of Vernal Pools

University of Massachusetts
Depository Copy

Vernal pools constitute a unique and increasingly rare type of wetland that is inhabited by many species of wildlife, some of which are totally dependent on vernal pool habitat for their survival. This uniqueness is due to a number of factors, including their small size, generally temporary nature, isolation from permanent water bodies and absence of fish populations. Owing to the fact that vernal pools are devoid of the effects of fish predation, the breeding strategies of a number of amphibian species have evolved to the point of total reliance on these isolated wetlands. The wood frog (Rana sylvatica) and all species of mole salamanders (genus Ambystoma) that occur in Massachusetts breed exclusively in vernal pools. These species annually risk the chance that the pools will dry up before their tadpoles/larvae complete metamorphosis in exchange for the benefit of not being subjected to fish predation. Areas in the immediate vicinity of the pool also provide these species with important nonbreeding habitat functions, such as feeding, shelter and overwintering sites. Many other species of amphibians utilize vernal pool habitat for breeding and nonbreeding functions, although they are not restricted to this type of wetland. The many diverse types of invertebrates that inhabit vernal pools provide important food for various species of birds, mammals and reptiles, as well as amphibians. Some invertebrates, such as fairy shrimps, spend their entire lives in this unique habitat.

The protection of vernal pool habitat is essential for the continued survival of wildlife species that are dependent upon this unique type of wetland. Destruction or alteration of a vernal pool is likely to have a very significant adverse impact on the local amphibian populations for which the pool serves as a traditional breeding site, because few if any of them will be able to find alternative breeding sites. The accelerated rate of development in the Commonwealth makes it imperative that vernal pools be certified and mapped in advance in an effort to steer proposed development projects away from these critical habitats.

Protection of Vernal Pool Habitat under the Wetlands Protection Act

The revised Massachusetts Wetlands Protection Act Regulations (310 CMR 10.00) which became effective on November 1, 1987, include provisions for the protection of certain vernal pool habitat within the Commonwealth. Under these regulations, vernal pool habitat is given virtually "automatic" protection only if it:

1. occurs either (a) within the 100 year inland floodplain or (b) on "Isolated Land Subject to Flooding" (as defined in the regulations at 310 CMR 10.57 (2)(b)); and
2. its existence and location has been certified by the Massachusetts Division of Fisheries and Wildlife.

Under the regulations, vernal pool habitat is presumed to exist on a property only if it has been certified and mapped prior to the filing of a Notice of Intent. Otherwise, applicants are not required to protect vernal pools (unless their existence is clearly demonstrated through scientific evidence presented at a public hearing).

The regulations emphasize that vernal pools are confined basin depressions which contain water for at least two continuous months in the spring and/or summer during most years, that fish are absent from these bodies of water, and that vernal pools are essential breeding habitat for certain amphibians as well as important habitat for other wildlife species. Vernal pool habitat may include the area within 100 feet of the mean annual boundaries of the vernal pool itself, but only insofar as such area is contained within a "resource area" protected under the Wetlands Protection Act (see 310 CMR 10.00 for resource area boundaries). The regulations do not contain any provisions for the protection of upland vernal pool habitat.

The Natural Heritage and Endangered Species Program will coordinate the vernal pool certification program for the Division of Fisheries and Wildlife. The Vernal Pool Certification Guidelines contained below have been reviewed and approved by the Massachusetts Department of Environmental Quality Engineering (DEQE), Division of Wetlands and Waterways Regulation, and are acceptable to that Division as being consistent with vernal pool habitat protection provisions of the Wetlands Protection Act Regulations.

The Natural Heritage and Endangered Species Program will not itself be identifying vernal pool habitat, but rather will certify vernal pools identified by others which meet the certification standards contained in this document. The Heritage Program will not certify whether or not the vernal pool habitat is within a resource area protected by the Wetlands Protection Act. This determination must be made by the town conservation commission (or the state DEQE upon appeal) upon the filing of a Notice of Intent under the Wetlands Protection Act.

The remainder of this document provides detailed information on the following four elements that are required for the certification of vernal pool habitat:

- I. Biological and physical criteria that are to be used in identifying vernal pool habitat; and
- II. Documentation of field observations; and
- III. Mapping criteria that are to be used in documenting the location of vernal pool habitat; and
- IV. Presentation of evidence on official forms.

VERNAL POOL CERTIFICATION CRITERIA

I. Biological and Physical Criteria

Vernal pool habitat is extremely important to a variety of wildlife species. Some amphibians breed exclusively in vernal pools, whereas other organisms such as fairy shrimps spend their entire life cycles confined to vernal pool habitat. Many additional wildlife species utilize vernal pools among various aquatic habitats for breeding, feeding and other important functions.

The species listed under categories A and B below are "obligate" vernal pool species--that is, species that are found only in vernal pools during all or part of their lifetimes, and that require vernal pools for their survival. They serve as direct indicators for the existence of vernal pool habitat. These species are the intended primary beneficiaries of vernal pool habitat protection. Documentation of vernal pool utilization by these species is the preferred method of identifying vernal pools. It is also generally the easiest type of evidence to find in the field.

The animal and plant species listed under categories C and D below are "facultative" vernal pool species--that is, species which occur in vernal pools, but which can also be found in permanent water. They serve as indirect indicators for the existence of vernal pool habitat. Because these species also occur in permanently aquatic habitats that support fish populations, it is essential that the absence of fish be documented for these vernal pools prior to the submittal of evidence for consideration for certification status. Generally, such documentation will consist of evidence that the pool dries up during the year. Category E may include a combination of obligate and facultative vernal pool species, including those not specifically listed in A and C, such as Spadefoot Toads (Scaphiopus holbrookii).

ANY ONE OF THE FOLLOWING (A THROUGH E) WILL VERIFY THE EXISTENCE OF A VERNAL POOL:

- A. Existence of (1) a confined basin depression and (2) evidence of breeding in standing water by any of the following amphibian species (these species breed only in vernal pools):
 - a. Wood Frog (Rana sylvatica)
 - b. Spotted Salamander (Ambystoma maculatum)
 - c. Blue-spotted Salamander (Ambystoma laterale)
 - d. Jefferson Salamander (Ambystoma jeffersonianum)
 - e. Silvery Salamander (Ambystoma "platineum")
 - f. Tremblay's Salamander (Ambystoma "tremblayi")
 - g. Marbled Salamander (Ambystoma opacum)

Species b through g above are collectively known as mole salamanders.

The presence of any of the following will be considered as acceptable proof that a vernal pool is utilized for breeding purposes by one or more of the above-named species:

1. Breeding adults
 - a. Wood frog—breeding chorus and/or mated pairs
 - b. Mole salamanders—courting individuals and/or spermatophores
 2. Two or more egg masses of any of the above-named species
 3. Wood frog tadpoles or mole salamander larvae
 4. Transforming juveniles
 - a. Wood frog—tail stubs evident
 - b. Mole salamanders—gill remnants evident; or
- B. Existence of (1) a confined basin depression and (2) the presence of fairy shrimp (Anostraca) or their eggs therein. These species spend their entire life cycles in vernal pool habitat; or
- C. Existence of (1) a confined basin depression which (2) contains standing water that dries up during the year (or which for other reasons is free of adult fish populations) and (3) the presence of two or more of the following in standing water (these species are not found in water that persists for less than two continuous months in the spring and/or summer):

- a. Breeding spring peepers (Hyla crucifer)*
- b. Breeding gray treefrogs (Hyla versicolor)*
- c. Breeding green frogs (Rana clamitans)*
- d. Breeding American toads (Bufo americanus)*
- e. Breeding Fowler's toads (Bufo woodhousii fowleri)*
- f. Breeding four-toed salamanders (Hemidactylium scutatum)*
- g. Adult red-spotted newts (Notophthalmus viridescens)
- h. Spotted turtles (Clemmys guttata)
- i. Painted turtles (Chrysemys picta)
- j. Snapping turtles (Chelydra serpentina)
- k. Water scorpions (Nepidae)
- l. Predaceous diving beetle larvae (Dytiscidae)
- m. Whirligig beetle larvae (Gyrinidae)
- n. Dobsonfly larvae (Corydalidae)
- o. Caddisfly larvae (Trichoptera)
- p. Dragonfly larvae (Odonata, Anisoptera)
- q. Damselfly larvae (Odonata, Zygoptera)
- r. Leeches (Hirudinea)

* Evidence for breeding activity includes breeding adults, eggs, tadpoles or larvae, and transforming juveniles (see category I.A. 1-4 above); or

- D. Existence of (1) a confined basin depression which (2) lacks standing water or which contains standing water that dries up during the year (or is otherwise free of adult fish populations) and (3) the presence of one or more of the following (these species are found only in areas that contain water for at least two continuous months in the spring and/or summer):

- a. Cases of caddisfly larvae (Trichoptera)
- b. Adults, juveniles or shells of either of the following:
 1. Freshwater clams (Pisidiidae)
 2. Amphibious air-breathing snails (Basommatophora)
- c. At least six of the following wetland plant species:
 1. Duckweeds (Lemna spp., Spirodela spp., Wolffia spp.)
 2. Fountain moss (Fontinalis spp.)
 3. False mermaid weeds (Proserpinaca palustris and P. pectinata)
 4. Bur-reeds (Sparganium angrocladum and S. chlorocarpum)
 5. Buttonbush (Cephalanthus occidentalis)
 6. Pondweeds (Potamogeton spp.)
 7. Bladderworts (Utricularia clandestina, U. gibba and U. subulata)
 8. Water-milfoils (Myriophyllum humile and M. tenellum)
 9. Water plantain (Alisma plantago-aquatica)
 10. Yellow water-crowfoot (Ranunculus flabellaris)
 11. Featherfoil (Hottonia inflata)
 12. Water-starworts (Callitriche spp.)
 13. False pimpernels (Lindernia anagallidea and L. dubia)
 14. Lance-leaved violet (Viola lanceolata)
 15. St. John's-worts (Hypericum adpressum, H. boreale, H. canadense, and H. mutilum)
 16. Smartweeds (Polygonum amphibium, P. hydropiper, P. hydropiperoides, P. pennsylvanicum and P. punctatum)
 17. A rush (Juncus pelocarpus)
 18. Sedges (Rhynchospora capitellata and R. fusca)
 19. Grasses

a. <u>Agrostis scabra</u>	g. <u>Panicum dichotomiflorum</u>
b. <u>Glyceria acutiflora</u>	h. <u>Panicum meridionale</u>
c. <u>Glyceria canadensis</u>	i. <u>Panicum philadelphicum</u>
d. <u>Glyceria fernaldii</u>	j. <u>Panicum rigidulum</u>
e. <u>Glyceria pallida</u>	k. <u>Panicum tuckermanii</u>
f. <u>Muhlenbergia uniflora</u>	l. <u>Panicum verrucosum</u> ; or

- E. Existence of all of the following:

1. Documented presence of water in a confined basin depression for at least two continuous months in the spring and/or summer; and
2. Confirmation that the vernal pool area becomes completely dry during a portion of the year (or other documentation proving the absence of adult fish populations); and
3. Presence of any amphibians and/or reptiles in standing water within the confined basin depression.

II. Required Documentation of Field Observations

A. One of the following types of evidence is required to verify the existence of a confined basin depression:

1. A clear photograph and/or statement of direct observation of a pool of standing water without an above-ground outlet. (The pool may occasionally have an intermittently flowing outlet, but the photograph must be taken and/or observations made at a time when this is not occurring.)
2. A clear photograph and/or statement of direct observation of an area lacking standing water that clearly contains a confined basin depression (applies only to categories I.B. and I.D., above).

B. One of the following types of evidence must be submitted to confirm observations of animal species that were observed (this evidence may not be necessary under category I.D., above):

1. Photograph(s). This is the preferred method. Both prints and slides are acceptable. The location, date and observer's name should be written on the back of each print or the margin of each slide.
2. Videotape recording. The location, date and observer's name should be included on the audio and/or visual portion of the recording.
3. Tape recording of a frog breeding chorus. The location, date and observer's name should be included on the recording.
4. Detailed description(s) of the organism(s) observed, including a discussion of the criteria that were used to identify the species involved. A drawing of the animal may be submitted in addition to the description.
5. Field notes of a biologist competent in animal identification.
6. Other clear scientific evidence.

C. One of the following types of evidence must be submitted to confirm observations of plant species that were observed (applies only to category I.D., above):

1. Herbarium specimen(s). The specimen(s) must be properly labelled.
2. Photograph(s). Both prints and slides are acceptable. The location, date and observer's name should be written on the back of each print or the margin of each slide.
3. Field notes of a biologist competent in plant identification.

D. One of the following types of evidence is required to confirm that a proposed vernal pool habitat area does not support adult fish populations (applies only to categories I.C., I.D., and I.E., above):

1. Recorded date when the pool was completely dry. Submission of a photograph of the dry depression is recommended.
2. Scientific evidence that documents the absence of fish.

E. The following evidence is required to support observations that a confined basin depression holds water for at least two continuous months in the spring and/or summer (applies only to category I.E., above):

1. A log book containing a record of observations in which the presence or absence of water in a depression was noted. The pool should have been visited on an approximately weekly basis. The approximate depth and dimensions of the pool should be noted on each observation date.
2. A list of all amphibians and reptiles that were observed in the pool must also be included in the log book. Species that used the pool for breeding purposes (include dates) should be noted.

III. Mapping Criteria

One of the following is required to identify the location of a vernal pool:

A. Metes and bounds

Compass bearings and measured distances (preferably within 1000 feet) to the pool from at least two permanent landmarks. The compass bearings must account for the appropriate declination. The locations of the landmarks and the vernal pool must appear or be placed on an assessor's map or other map used for property tax purposes. If there are other nearby confined basin depressions with which the vernal pool could be confused, these should also be noted on the map. A photocopy of an 8-1/2" x 11" section of the appropriate United States Geological Survey 7-1/2' quadrangle map with the approximate site of the vernal pool clearly marked should also be included. It is recommended that a sketch map and/or detailed description of features in the immediate vicinity of the vernal pool also be submitted.

B. Aerial photographs

The location of the vernal pool must be clearly visible on the aerial photograph. The location of the vernal pool must also appear or be placed on an assessor's map or other map used for property tax purposes. If there are other nearby confined basin depressions with which the vernal pool could be confused, these should also be noted on the map. A photocopy of an 8-1/2" x 11" section of the appropriate United States Geological Survey 7-1/2' quadrangle map with the approximate site of the vernal pool clearly marked should also be included.

C. Professional survey

The location of the vernal pool must appear or be placed on an assessor's map or other map used for property tax purposes. If there are other nearby confined basin depressions with which the vernal pool could be confused, these should also be noted on the map. A photocopy of an 8-1/2" x 11" section of the appropriate United States Geological Survey 7-1/2' quadrangle map with the approximate site of the vernal pool clearly marked should also be included.

IV. Field Observation Forms

Application for certification status of a proposed vernal pool habitat should be submitted on standard field observation forms available from the following address:

Vernal Pool Certification
Natural Heritage and Endangered Species Program
MA Division of Fisheries and Wildlife
100 Cambridge Street
Boston, MA 02202
617-727-9194

Completed field observation forms and other supporting documentation must be submitted to the above address for certification review. All submitted materials (including photographs, tape recordings, etc.) will be retained by the Natural Heritage and Endangered Species Program. Upon review of the submitted documentation, the Program will:

1. Certify the vernal pool habitat if the documentation that is received is consistent with the criteria outlined above. Notification of certification will be sent to the local conservation commission, the appropriate DEQE regional office, the landowner, and the party submitting the documentation; or
2. Request additional documentation from the observer; or
3. Deny the request for certification if the documentation that is received is not consistent with the criteria outlined above.

Vernal Pool Field Observation Forms

IMPORTANT: This form must be signed on the back prior to submittal

Observer information: Name: _____
Address: _____

Telephone: _____

Submit completed forms to:
Vernal Pools
MNH&ESP
Route 135
Westboro, MA 01581

*** REQUIRED ***

- Photographs of the pool and of species observed must be submitted for certification
 - USGS Topographic map, Town Assessor's map
- Refer to the "Guidelines for Certification of Vernal Pool Habitat" (1988) for documentation standards for the certification of vernal pool habitat

Mapping Sources Submitted:
(Check all submitted)

REQUIRED

_____ USGS
_____ Assessor's

At Least ONE Additional

_____ Metes and Bounds (see "Guidelines")
_____ Professional Survey
_____ Aerial Photograph
_____ Other: _____

YES / NO Were any rare state-listed species observed utilizing this pool?

YES / NO Is documentation of this/these species included with this filing?

Are fish present?

YES / NO Pool observed dry (date) _____

YES / NO Obligate vernal-pool breeding species observed

Other evidence: _____

Vernal Pool Data

County: _____

Town: _____

USGS Quadrangle Name: _____ Series: 7.5' X 7.5' 7.5' X 15' (Circle one)

Written Directions to pool: _____

Observation Dates: Last date biota observed: _____

Last date pool observed (if different): _____

First date biota/pool observed (if different): _____

Observations:
Obligate Species

	Wood Frog	Spotted Salamander	Blue-spotted Salamander	Jefferson's Salamander	Codes
Date, Evidence Code					
	Marbled Salamander	Unidentified Mole Sal.	Spadefoot Toad	Fairy Shrimp	1. Breeding chorus 2. Mated pairs 3. Courting adults 4. Spermatophores 5. Egg masses 6. Frog tadpoles 7. Salamander larvae 8. Transforming juveniles
Date, Evidence Code					

Facultative Species (See Guidelines)

Species _____ Date _____ Observations _____

1. _____
 2. _____
 3. _____
 4. _____
- Attach extra sheets if needed

General Description:

Wetlands Resource Area Type: _____ ILSF _____ BLSF _____ BVW _____ Upland _____ Unknown
 _____ 10 YR FLOOD PLAIN _____ 100 YR FLOOD PLAIN

Is there an inlet or outlet to the pool? Inlet: Y / N Outlet: Y / N
 Is the inlet/outlet permanent? Inlet: Y / N Outlet: Y / N

Vegetation: Tree canopy closure over pool (circle one): Open Complete Partial _____ %

Dominant vegetation *type* within pool: _____

Approximate percent cover: _____

Dominant vegetation *type* within 100 feet of pool: _____

Approximate percent cover: _____

Mosses
 Submergents
 Emergents (grasses, sedges, rushes)
 Shrubs
 Forested

Pool Bottom / Soil Type: (Circle all that apply)

PEAT LEAF LITTER MUD/MUCK SAND GRAVEL COBBLES BOULDERS/BEDROCK

Size of pool: Length: _____ Width: _____

Area: _____

Depth (Ave.): _____

Property Owner(s): Name _____

Address: _____

I hereby certify under pains and penalties of perjury that the information contained in this report is true and complete to the best of my knowledge.

Signature _____

Date _____

Selected Bibliography

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Help For Mapping Vernal Pools

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Kals, W.S. 1983. *Land Navigation Handbook*. Sierra Club Books, San Francisco.

Mooers, Robert. 1972. *Finding Your Way in the Outdoors*. Outdoor Life, New York.

USGS Topographical Maps are Available From:

Eastern Mapping Center (NCIC)
United States Geological Survey
536 National Center
Reston VA 22092
(703) 860-6336

United States Geological Service Map Sales
Box 25286
Denver, CO 80225
1-800-872-6277

A selection of USGS topographical maps was available from the following Massachusetts retailers as of 1995:

A J Hastings, Inc.
45 S. Pleasant Street
Amherst, MA 01002
(413) 253-2840

Cartographic Information/ESIC
University of Massachusetts
Blaisdell House
Amherst, MA 01003
(413) 545-0359

University Store
Campus Center
Univ. of Massachusetts
Amherst, MA 01003
(413) 545-2619

Casimir Pinigis
55 Elm Street
Athol, MA 01331
(508) 249-8486

L H Cooper Company, Inc.
5 N. Main Street
Attleboro, MA 02703
(617) 222-0646

Country Bike Sports
12 Exchange Street
PO Box 40
Barre, MA 01005
(508) 355-2219

Pro-Motion
111 South Street
Bedford, MA 01730
(617) 275-1113

Globe Corner Book Store
239 Causeway Street
4th Floor
Boston, MA 02114
(617) 723-1676

Globe Corner Book Store
3 School Street
Boston, MA 02108
(617) 523-6658

Globe Corner Book Store
500 Boylston Street
Boston, MA 0116
(617) 859-8008

Red Top Sport Goods, Inc.
265 Main Street
Buzzards Bay, MA 02532
(617) 759-3371

Globe Corner Book Store
28 Church Street
Cambridge, MA 02138
(617) 497-6277

Mayflower Shop
475 Main Street
Chatham, MA 02633

GeoPlus
130 Centre Street
Dale Building
Danvers, MA 01923
(800) 292-2102

Wuersch Time, Inc.
1273 Robeson Street
Fall River, MA 02720
(508) 672-8018

General Sporting Goods Corp
38 Main Street
Gardner, MA 01440
(617) 632-0620

Building Center, Inc.
1 Harbor Loop
PO Box 180
Gloucester, MA 01930
(508) 283-3060

Appalachian Mountain Gear
777 South Main Street
Great Barrington, MA 01230
(413) 528-8811

The Bookloft
Barrington Plaza
Great Barrington, MA 01230
(413) 528-1521

South View-Casey Glass
303 Main Street
Hampden, MA 01036
(413) 566-2445

Paperdilly, Inc.
74 Main Street
Lee, MA 01238
(413) 243-1928

Arcadian Shop
Route 7
PO Box 1637
Lenox, MA 01240
(413) 637-3010

World Eagle, Inc.
111 King Street
Littleton, MA 01460
(508) 486-9180

Natick Outdoor Store
38 North Ave
Natick, MA 01760
(508) 653-9400

C.E. Beckman & Company
11-35 Commercial Street
PO Box 971
New Bedford, MA 02741
(508) 994-9674

Saltmarsh
777 Purchase Street
New Bedford, MA 02740
(508) 997-0061

The Birdwatcher of Newburyport
27 Olive Street
Newburyport, MA 01950
(508) 462-1276

The Birdwatcher of Newburyport
50 Water Street, at the Tannery
Newburyport, MA 01950
(508) 462-2473

Don Gleasons Campers Supply
9 Pearl Street
PO Box 87
Northampton, MA 01061
(508) 584-4895

Farmington River Country Store
Route 8, PO Box 163
Otis, MA 01253
(413) 269-6874

Dave's Sporting Goods
1164 North Street
Pittsfield, MA 01201
(413) 442-2960

Gowdy Inc (Shandoff)
297 North Street
PO Box 0152
Pittsfield, MA 01201
(413) 499-1270

R.E.I.
279 Salem Street
Reading, MA 01867
(617) 944-5103

South Wellfleet General Store
Route 6, Box 267
South Wellfleet, MA 02663
(508) 349-2335

Riverview Bait and Tackle
1273 RT 2F
South Yarmouth, MA 02564
(508) 394-1035

Johnson's Bookstore
1379 Main Street
Springfield, MA 01103
(413) 732-6222

Squannacook River Outfitters
18 Main Street
Townsend, MA 01469
(508) 587-5332

Bunch of Grapes Bookstore
68 Main Street
PO Box 1608
Vineyard Haven, MA 02568
(617) 693-2291

Webster Lake Sporting
144 Gore Road
Webster, MA 01570
(508) 943-6309

Backpacking Etc.
369 Memorial Ave
West Springfield, MA 01089
(413) 781-0388

Conner's Inc.
34 Elm Street
Westfield, MA 01085
(413) 563-7574

Harris Office Products, Inc.
Six Cartisle Pl
Westford, MA 01836
(508) 692-3113

The Mountain Goat
130 Water Street
Williamstown, MA 02167
(413) 458-8445

Map Shack
959 Main Street
Winchester, MA 01890
(617) 721-4943